WISER User's Guide

Version 2.3

**Wireless Information System
for Emergency Responders**

NATIONAL
LIBRARY OF
MEDICINE

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1.   Introduction

The Wireless Information System for Emergency Responders (WISER) is a system concept for providing First Responders at the scene of hazardous material incidents – chemical, biological or radioactive – with integrated information, decision support, and communications. WISER provides critical chemical information quickly and conveniently on mobile devices, such as PDAs, Windows Desktop computers, tablet computers, field laptops, mobile phones, and mobile data terminals. It aids in the identification of unknown substances and, once the substance is identified, provides guidance on immediate actions necessary to save lives and protect the environment. Substance information and identification properties come from the Hazardous Substances Data Bank (HSDB), developed and maintained by the National Library of Medicine.

WISER currently exists as a standalone PDA application for Pocket PC or Palm OS devices, a Windows Desktop application and as a Web application; this document describes the Web application version. WISER contains HSDB information and decision support logic for 400+ substances (future versions will provide access to more substances). The substances were chosen based on First Responder inputs, degree of chemical hazard, and historical frequency of incidents. The WISER application assists First Responders in rapidly determining the substance involved and gives the First Responder critical information regarding the substance, allowing them to take the necessary immediate actions to minimize the effects of the hazmat incident.

1.1.   Features

- Access to data from the Hazardous Substance Data Bank, covering basic, physical, hazardous material, medical, and environmental areas
- Multiple substances, chosen based on First Responder inputs, degree of chemical hazard, and historical frequency of incidents
- Substance identification support, based on physical properties, patient symptoms, and NFPA 704 hazard values

1.2.   System Requirements

A computer with access to the internet to access the Web application version. WebWISER is best viewed on the following browsers:

- Internet Explorer 6.0 or greater
- Netscape 8.0 or greater
- Mozilla Firefox 1.0.4 or greater
- Netscape 7.1 for Mac or greater
- Safari for Mac with OS version 10.4 or greater

1.3.   Disclaimer

The U.S. Government does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed.

It is not the intention of NLM to provide specific medical advice to the public, but rather to provide users with information to better understand their health.

NLM does not endorse or recommend any commercial products, process, or services.

2.   Using WISER

The WISER application is run in a web browser and can be accessed by via the following URL:

http://webwiser.nlm.nih.gov

This will display the following home page:

The remainder of this section details the functionality on each of the screens that comprise the WISER application.

2.1.   Overview

WISER consist of the following primary screens:

- Substance List Page – contains the list of all available substances

- Data Page – displays substance data for a selected substance

- Help Identify Page – for identification of unknown substances

Each of these screens has in common a menu at the top of the screen for selecting the user profile and for moving between the various pages.

2.1.1.   Setting the User Profile

The User Profile determines how certain information is presented by WISER, tailoring the application to suit the needs of the type of user. Specifically, it controls what 'hot links' are presented on the Data Screen's data menu, ensuring that the most relevant information is the most readily available.

To set the User Profile, click the menu's profile dropdown arrow. When this is done, a context menu opens presenting the available profiles, as shown below.
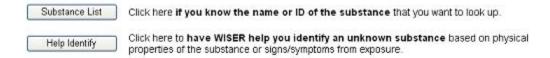
Change the current profile by selecting anyone of the available profiles shown.

2.1.2.   Menu Links

Access to the Substance List Page, is available via the Substance List link on the menu. Clicking on this link takes you to the Substance List Page at any point within the application. Similarly, clicking on the Help Identify link in the menu will take you to the Help Identify Page at any point within the application.

Clicking on the Home link will result in the display of the original page that was accessed via the WISER URL (http://webwiser.nlm.nih.gov). This page has two buttons that allow you to also access the Substance List Page and the Help Identify Page as seen below:

The About WISER link takes you to the about screen which provides you with the WISER database and application versions along with a brief disclaimer and text describing WISER.
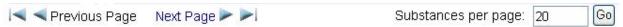
2.2.   Substance List Page

■   The Substance List page is presented upon clicking either the Substance List link in the menu or by the Substance List button on the home screen.
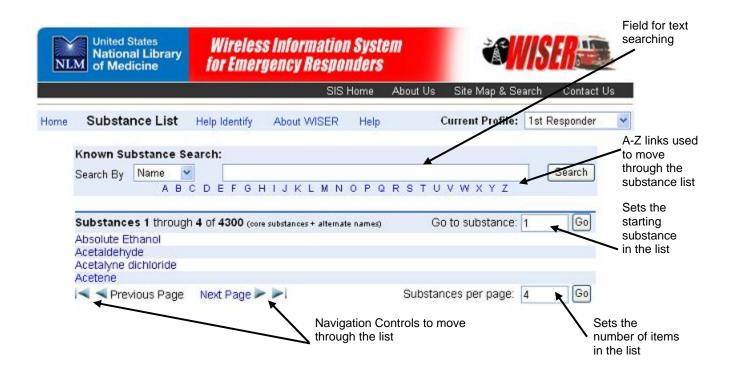
2.2.1.   Known Substance Search

If you know what the substance is, you can locate it by one of the following methods:

■   Moving through the list of substances via the following control:

![Previous Page Next Page control with Substances per page: 20 Go]

■   Using the A-Z links as seen in the image below. This option is only available when the list is in a "Search By Name" state.

■   Entering one of the substance's identification numbers in the **Known Substance** field, where the possibilities are UN/NA number, CAS registry number, and STCC number

To use the **Known Substance** text field, click in the text field with your mouse and begin typing. When you have finish typing in the whole or partial value click on the Search button and the list will advance to the closest match to the supplied text. The **Search by** pull-down menu selection controls whether the substance name or an identification number should be entered, and controls the ordering of the list. The options available are as follows:

■ Name: list is ordered alphabetically by name

■ UN/NA: list is ordered by UN/NA number

■ CAS RN: list is ordered by CAS registry number

■ STCC: list is ordered by STCC number

Click here   Select one of these
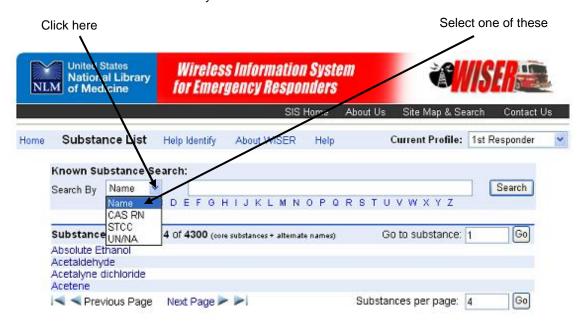

Upon locating the desired substance in the substance list, clicking it displays the Data Screen for that substance.

2.2.1.1.   Search by Name

As shown in the previous image, when **Name** is selected from the **Search By** menu, the substance list is alphabetically sorted, and is augmented with "aliases", i.e. other names by which the HSDB substances in WISER are known.

Note that numbers and punctuation that prefix a name are ignored for sorting and search purposes. When entering text in the **Known Substance** field, start with the first letter.
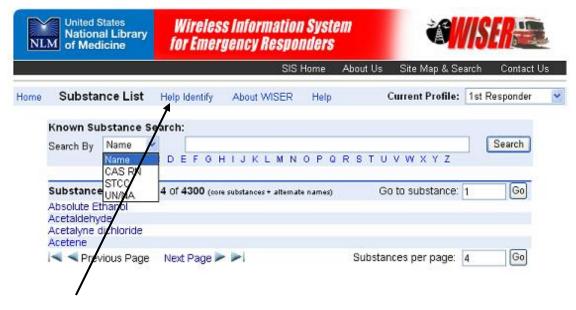
2.2.1.2.   Search by Number

As shown in the following figure, when **UN/NA**, **CAS**, or **STCC** is selected from the **Search By** menu, the substance list contains only the HSDB substance names (no aliases), is order by the selected identification number, and each substance name is prefixed with the identification number.

2.2.2. Unknown Substance

If you are trying to identify an unknown substance, click the **Help Identify** button to advance to the Search Screen.

Click either button

2.3. Data Screen

The Data Screen is presented when you click on a substance name from the Substance List or from the Search Screen's results list. It is used to select and view all data that is available for the substance. To return to the Substance List, click the Substance Link in the menu bar.

Click here

Substances 1 through 4 of 4300 (core substances + alternate names)   Go to substance: 1   Go
Absolute Ethanol
Acetaldehyde
Acetalyne dichloride
Acetene
|◄ ◄ Previous Page   Next Page ► ►| Substances per page: 4   Go

To get here

United States National Library of Medicine — Wireless Information System for Emergency Responders — WISER

SIS Home   About Us   Site Map & Search   Contact Us

Home   Substance List   Help Identify   About WISER   Help   Current Profile: 1st Responder

Ethanol (alias of Absolute Ethanol)
CAS RN: 64-17-5

Data Categories:

Key Info

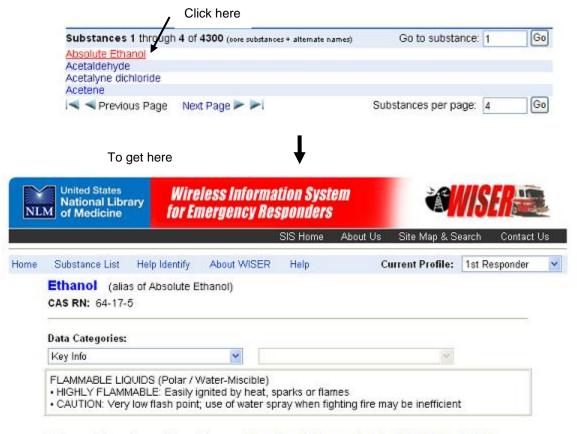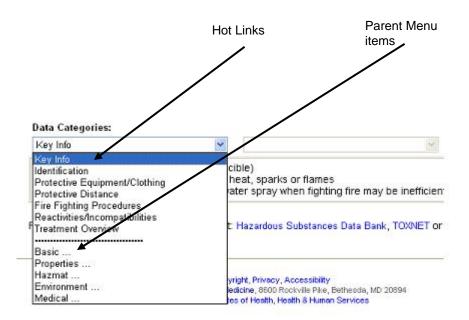FLAMMABLE LIQUIDS (Polar / Water-Miscible)
• HIGHLY FLAMMABLE: Easily ignited by heat, sparks or flames
• CAUTION: Very low flash point; use of water spray when fighting fire may be inefficient

Find more information on this substance at: Hazardous Substances Data Bank, TOXNET or PubMed

As shown in the above figure, the top of the Data Screen indicates the name of the substance and its CAS registry number. If an alias of the substance was selected from the Substance List, the alias is indicated next to the substance name. If the Substance List was sorted by UN/NA or STCC numbers, then those ID numbers will be included next to the CAS RN. In the above example, "Absolute Ethanol," an alias of the substance known in the HSDB as Ethanol, was chosen from the Substance List.

The Data Screen initially displays Key Info, a summary of the most immediate, critical aspects of a substance. To see additional data, click the first drop down menu, as shown in the following figure, to bring up a menu of 'hot links' and parent menu options. If a parent menu option is selected then the second drop down menu will be populated with additional submenu items associated with the selected parent menu item.

Hot Links

Parent Menu
items

Data Categories:

Key Info

| Key Info |
| Identification |
| Protective Equipment/Clothing |
| Protective Distance |
| Fire Fighting Procedures |
| Reactivities/Incompatibilities |
Treatment Overview
Basic ...
Properties ...
Hazmat ...
Environment ...
Medical ...

cible)
heat, sparks or flames
ater spray when fighting fire may be inefficien

Hazardous Substances Data Bank, TOXNET or

yright, Privacy, Accessibility
edicine, 8600 Rockville Pike, Bethesda, MD 20894
tes of Health, Health & Human Services

Sub-Menu
items

Data Categories:

Basic ...

UN 1170; Ethyl alcohol

IMO 3.2; Ethyl alcohol (Ethanol or ethanol so

IMO 3.3; Ethyl alcohol (Ethanol or ethanol so

Find more information on this substance at: H   r Pu

Basic Subcategories:

Shipping Name/Number

| Shipping Name/Number |
| CAS Registry Number |
| Standard Transportation No. |
| Synonyms |
| Molecular Formula |
| Shipment Methods/Regulations |
| EPA Hazardous Waste No. |
| Major Uses |
| Storage Conditions |

The hot links are generally duplicates of items found within the submenus, but provide a quicker way to get to the most relevant information for the user profile. What hot links are available depend on the user profile.

The bottom portion of the Data Categories menu contains submenu options, where each submenu represents a category of options. Selecting one of these populates the submenu, listing the data elements in that category. Selecting a submenu item replaces the previous data display contents with the selected data element.

The hot links that are available on the data menu are as follows. Each is a duplicate of one of the submenu options, except for those "custom" options that are noted.

- Common to all user profiles:

  - Key Info – this custom option present the most immediate dangers or considerations for an encounter with the substance

  - Identification – this custom option provides a summary of the properties, symptoms, and NFPA 704 hazard values associated with the substance; it reflects the data that is used when searching for an unknown substance

- 1st Responder

  - PPE (Personal Protective Equipment & Clothing) – also available from the Hazmat submenu

  - Protective Distance – this custom option reflects the Public Safety section of the DOT Emergency Response Guidebook – also available from the Hazmat submenu

  - Fire Fighting Procedures – also available from the Hazmat submenu

  - Reactivities & Incompatibilities – also available from the Hazmat submenu

  - Treatment Overview – also available from the Medical submenu

- Hazmat Specialist

  - Property Summary – this custom option provides a collection of select properties that are available separately under the Properties submenu – also available from the Properties submenu

  - PPE (Personal Protective Equipment & Clothing) – also available from the Hazmat submenu

  - IDLH (Immediately Dangerous to Life or Health) – also available from the Medical submenu

  - Flammable Limits – also available from the Hazmat submenu

  - NFPA Hazard Classification – also available from the Hazmat submenu

- EMS

  - Treatment Overview – also available from the Medical submenu

  - Health Effects – also available from the Medical submenu

  - Toxicity Summary – also available from the Medical submenu

  - IDLH (Immediately Dangerous to Life or Health) – also available from the Medical submenu

  - NFPA Hazard Classification – also available from the Hazmat submenu

The data elements available from the submenus of the data menu are shown below:

Basic Information
- UN/NA/IMO identification numbers
- CAS Registry Number
- STCC Number

- Synonyms
- Molecular Formula
- Shipment Methods & Regulations
- EPA Hazardous Waste Number

- Major Uses
- Storage Conditions

Properties
- Property Summary
- Color and Form
- Odor
- Odor Threshold
- Taste
- Density/Specific Gravity
- Molecular Formula
- Molecular Weight
- Vapor Density
- Vapor Pressure
- Flash Point
- pH
- Melting Point
- Boiling Point
- Autoignition Temperature
- Decomposition
- Polymerization
- Stability/Shelf Life
- Viscosity
- Solubility
- Other Properties

Hazardous Material Information
- DOT Emergency Guidelines
- Protective Distance
- NFPA Hazard Classification
- Fire Potential
- Fire Fighting Procedures
- Hazards Summary
- PPE (Personal Protective Equipment & Clothing)

- Flammable Limits
- Toxic Combustion Products
- Explosive Limits & Potential
- Reactivities & Incompatibilities
- Other Firefighting Hazards
- Other Hazardous Reactions
- Cleanup Methods
- Disposal Methods

Medical Information
- Treatment Overview
- Health Effects
- IDLH (Immediately Dangerous to Life or Health)
- Threshold Limit Values
- NIOSH Recommended Exposure Levels
- OSHA Standards
- Skin, Eye and Respiratory Irritations
- Other Preventive Measures
- Toxicity Summary
- Range of Toxicity
- Laboratory
- Evidence for Carcinogenicity
- Radiation Limits & Potential

Environmental Information
- Environmental Fate/Exposure Summary
- Environmental Fate
- CERCLA Reportable Quantities
- Non-Human Toxicity Values
- Ecotoxicity Values
- Soil Adsorption/Mobility
- Volatilization from Water/Soil

2.3.1.   On-line Substance Lookup

At the bottom of the Data Screen is a feature that permits an on-line lookup of the current substance indicated in the following image.

Find more information on this substance at: Hazardous Substances Data Bank, TOXNET or PubMed

Whereas WISER is primarily intended to provide information relevant to the first responder community, this lookup feature provides a convenient means by which complete and comprehensive information on the substance can be accessed.

To use this feature, click one of the lookup location links (Hazardous Substance Data Bank, TOXNET, or PubMed). Your default Internet browser will open outside of WISER and show the results of the search for the current substance at the selected location.

The lookup locations currently available include:

- **NLM HSDB:** the Hazardous Substances Data Bank is the scientifically peer-reviewed database at the National Library of Medicine that serves as the primary data source for WISER. This option allows the complete HSDB content of a substance to be viewed, as opposed to the subset that is contained within WISER. HSDB provides broad scope in human and animal toxicity, safety and handling, environmental fate, and more. It is one of the cluster of NLM TOXNET databases (see below).

- **NLM TOXNET:** this option searches for the current substance across a cluster of databases on toxicology, hazardous chemicals, and related areas. For more details, see http://toxnet.nlm.nih.gov/index.html.

- **NLM PubMed:** this option searches for the current substance at PubMed, a service of the National Library of Medicine that includes over 15 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s. PubMed includes links to full text articles and other related resources. For more details, see http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?.
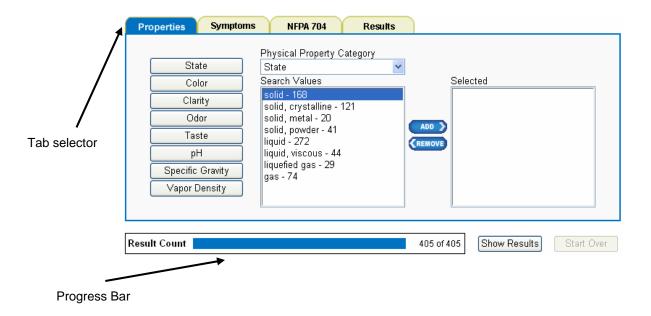
2.4. Help Identify Screen

Note: *The sections that follow contain references to substance counts which may change as updated versions of the WISER database are released. This would be caused by the addition of new substances or updates to the search data. The counts reflected in these sections should be used for example purposes only.*

When the substance involved in an incident is unknown, WISER can assist in identifying it. This capability is on the Help Identify Screen, accessed via the **Help Identify** Link on the Menu. It allows the user to select symptoms, properties, and NFPA 704 hazard values to narrow down the list of possible substances.

There are two main areas of the Help Identify Screen. Most of the screen consists of a set of tabs: a Properties tab for indicating physical properties of the unknown substance, a Symptoms tab for entering symptoms of victims exposed to the unknown substance, a NFPA 704 tab for entering placard values, and a Results tab that displays the results of the search. The bottom portion of the screen consists of a progress bar that indicates the number of substances in the WISER data and how many of those substances are currently in the result set.

Tab selector

Progress Bar

Searches are started by clicking the Start Over button if enabled. If this button is disabled then a new search is already started. Once a property, symptom, or NFPA 704 hazard value has been selected, this button is enabled allowing any previous selected properties or symptoms to be removed from the selected list thereby starting a new search.   Select the **Properties** to enter physical properties of the unknown substance, the **Symptoms** tabs to enter symptoms of victims of exposure, and the **NFPA 704** tab to enter NFPA 704 placard values. As "search values" are entered on the properties and symptoms tab, the results set will shrink, as indicated by the progress bar at the bottom of the screen. Finally, select the Results tab or click on the Show Results button to display a list of the substances in the results set. Substances can be selected from there to display the Data Screen.

2.4.1.   Properties Tab

To enter physical properties of the unknown substance, select the **Properties** tab (seen in the previous figure).
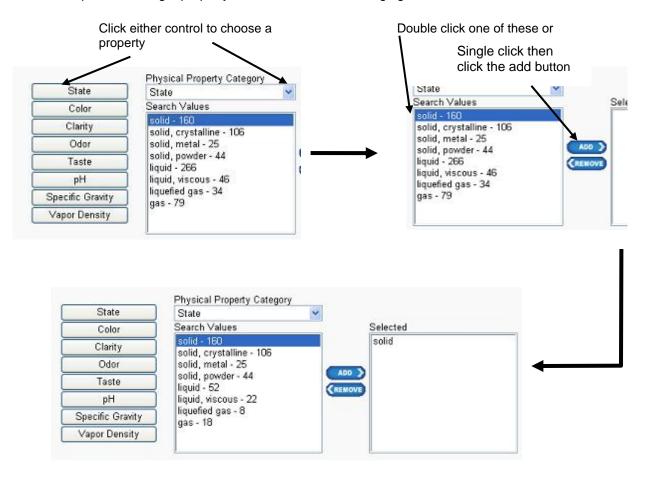
The main content of the Properties tab is a column of buttons representing the categories from which properties can be selected, and a list showing the current selections. The property categories consist of:

- State
- Color
- Clarity
- Odor
- Taste
- pH
- Specific Gravity (or Density)
- Vapor Density

Selecting one of the category buttons, such as 'State', displays a list of the properties in that category. Next to each property option is an indication of the number of substances having data that match that property AND each of the other property, symptom, and NFPA 704 selections already made. Note that these numbers include substances that do not have sufficient data to determine whether or not there is a match. For example, in the odor category, the number displayed next to each odor option represents the number of substances that indicate that odor, plus the number of substances which don't have odor data, and thus it can't be determined if they have the odor. This follows the general philosophy that searches should err on the side of inclusiveness rather than exclusiveness, thus reducing the risk of the unknown substance being unintentionally excluded from the search results.
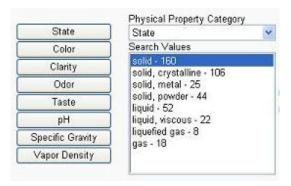
Following selection of a property, the Selected list on the Properties page updates to reflect the selection. The steps in selecting a property are shown in the following figure.

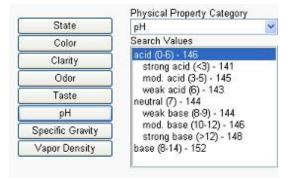A property displayed in the Selected list can be double clicked to remove the selection. You can also single click a value in the Selected list and click the Remove button for the same effect. Once the property is removed, you will see that the results count has increased, which reflects the addition of those substances that were previously removed. Also, the Selected list no longer contains the removed property.

The next image illustrates two property lists that provide examples of related options, where one or more options are available that are more specific descriptions of a single more general option.
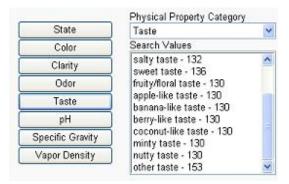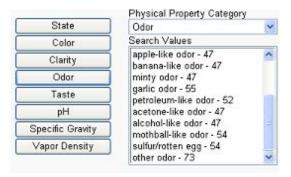

In the case of the State category, there is a 'solid' option, and then three additional solid options that are more specific, such as 'solid, crystalline'. The substances that will be matched by choosing the more general 'solid' option are inclusive of all the substances matched by one of the more specific options. If a more specific option is chosen, such as 'solid, crystalline', then selection of the more general 'solid' option is not necessary.

A similar situation exists for the pH category, where the broad ranges of acid and base can be selected, or a more specific range within those can be selected, such as "weak acid", "moderate acid", and "strong acid". In this case, indenting is used to help illustrate the relationships, and the names of the options are augmented with the numeric pH values that the named range applies to.

For the properties Odor and Taste, 'other odor' and 'other taste' options are available at the bottom of their respective property lists, as shown in the following figure.
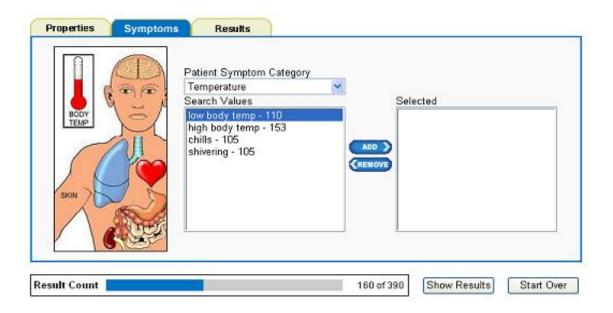
The 'other odor/taste' options capture the substances that have an odor/taste, but not one that can be associated with one of the specific odors/tastes in the list. If you have odor or taste observations available, you should first examine the rest of the properties in the list, which begin with odorless/tasteless, and continue with specific odors/tastes. If a suitable match cannot be found, then resort to selecting the 'other' option at the bottom. ALL substances that include odor or taste data are included in the 'other' option; if a specific odor or taste is selected, then it would not be appropriate to also select the 'other' option.

2.4.2.   Symptoms Tab

To enter patient symptoms of the unknown substance, select the **Symptoms** tab.

The main content of the Symptoms page is an image of a human body with selectable regions that identify the categories from which symptoms can be selected. A dropdown list to the right of the image can also be used to select the categories. Also to the right of the image is a list showing the selectable symptoms for a given category and above this is a dropdown list which can also be used to select. On the far right is the list of symptoms that have been selected so far. The regions of the human body image that can be selected are shown below, with the names of the symptom categories to which they correspond (if different):

- brain (neurological category)
- eyes
- ears
- nose
- mouth and throat
- lung (respiratory category)
- heart (cardiovascular category)
- stomach/kidney (gastro/urinary category)
- arm (skin category)
- thermometer (body temperature category)

Selecting one of the above areas of the body, such as the brain, displays a list of the symptoms options in the corresponding symptom category, such as 'neurological'. Next to each symptom option is an indication of the number of substances having data that match that symptom AND each of the other property, symptom, and NFPA 704 selections already made.
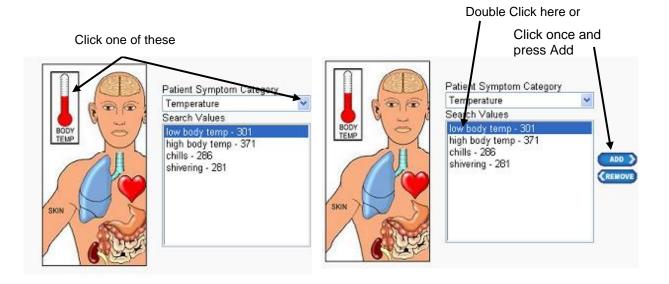
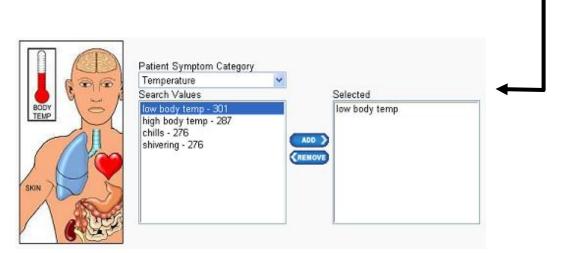Note the following characteristics of the symptom options:

- The number of substances displayed next to the symptoms options include substances that do not have sufficient data to determine whether or not there is a match. In other words, the number represents the number of substances that cause that symptom, plus the number of substances which don't have symptom data, and thus it can't be determined if they cause the symptom. This follows the general philosophy that searches should err on the side of inclusiveness rather than exclusiveness, thus reducing the risk of the unknown substance being unintentionally excluded from the search results.

- Symptoms are placed in the categories where they are observed. For example, "cyanosis/blue" is a symptom in the skin category. Cyanosis is not a skin symptom, but signs of cyanosis are evident in the skin.

- Symptoms may occur in more than one category. Sneezing, for example, can be found both in the Nose and the Respiratory categories. Other examples are Hypoxia/Cyanosis (Respiratory and Cardiovascular categories), Numbness/Tingling (Skin and Neurological categories), and Coughing/Choking (Respiratory and Mouth/Throat categories). For such options, the number of substances displayed next to the symptom in one category may not match the number displayed next to it in another category. This is because of the inclusion in those numbers of substances that don't have data. For example, the number of substances known to cause sneezing will be the same regardless of whether sneezing is chosen from the nose or respiratory category, BUT the number of substances that do not have symptom data for the nose category may be different than the number that do not have data for the respiratory category. Thus, the inclusion of these "unknowns" may produce slightly different results depending on from which category sneezing is selected.

Following selection of a symptom, the **Selected** list on the Symptoms page is updated to reflect the selection. The steps in selecting a symptom are shown in the following figure.

Double Click here or

Click once and
press Add

Click one of these
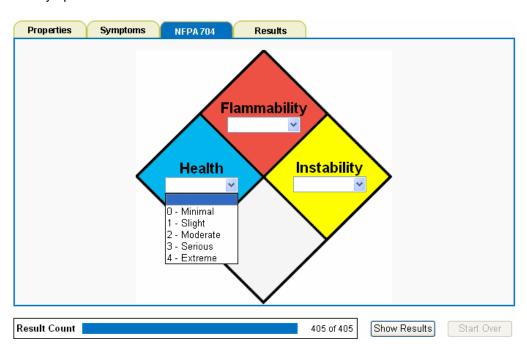
A symptom displayed in the Selected list can be double clicked to remove the selection. You can also single click a value in the Selected list and click the Remove button for the same effect. Once the symptom is removed, you will see that the results count has increased, which reflects the addition of those substances that were previously removed. Also, the Selected list no longer contains the removed symptom.
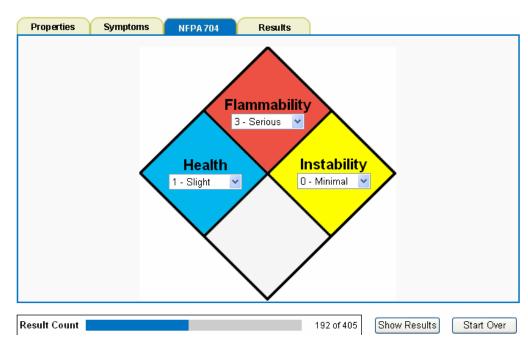
2.4.3.   NFPA 704 Tab

To enter hazard values from an NFPA 704 placard, select the **NFPA 704** tab. This presents the hazard placard diamond that identifies the health, flammability, and instability hazards of a material and the degree of severity for each.

From a given placard, enter the observed values into the corresponding hazard diamonds, using the drop-down list in each of the diamonds that provides the list of severity values. As each value is entered, the results count decreases. This reflects the narrowing down of the results list to include only those substances whose NFPA 704 data matches the values that have been input, **AND** which match any other property and/or symptom data that has been entered on the other tabs.
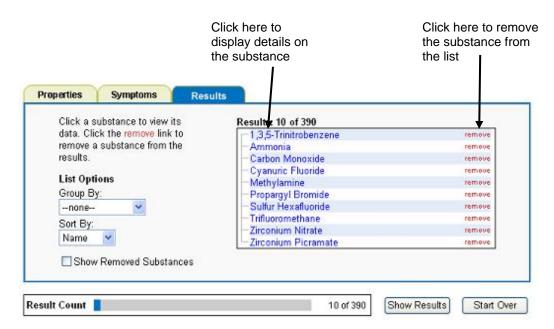
The NFPA 704 searching supports both full and partial placard inputs. Simply leave the selection blank for any hazard diamond for which data is not available (for example, part of the placard is destroyed or otherwise not legible). The results will reflect those substances that have NFPA 704 data matching the provided hazard inputs, ignoring the hazard data that has been left blank.

Note that inputs are not currently permitted for the special hazards (white) diamond of a placard. Support for this will be added in the future.

2.4.4.   Results Tab

The Results tab displays a list of the substances that match ALL of the properties, symptoms, and NFPA 704hazard values that have been selected during a search for an unknown substance. Clicking a substance in this list displays the Data Screen, the same as selecting a substance from the Substance List Screen. To return to the search results, click the Help Identify link in the menu.
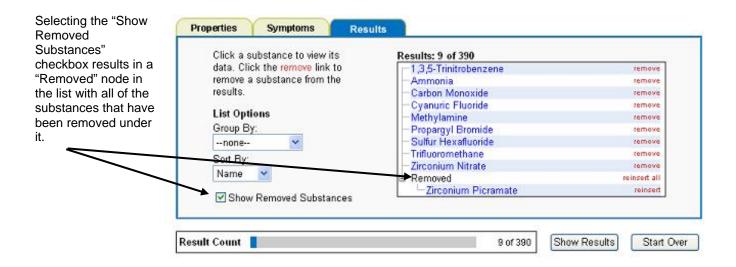
If a substance in the list is known to not be the unidentified substance, remove it from the results by clicking the remove link as shown in the previous figure.

The size of the results list indicated next to the progress bar decrements to indicate the removal.

Any substances removed in this manner can be displayed again if the Show Removed checkbox is checked, as shown in the next figure.

Selecting the "Show Removed Substances" checkbox results in a "Removed" node in the list with all of the substances that have been removed under it.
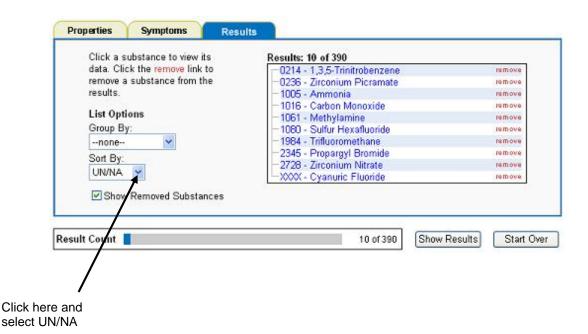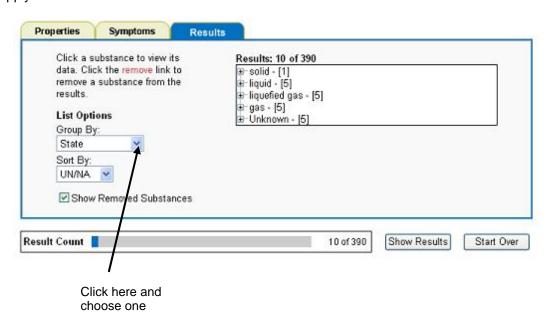
As shown above, when removed substances are shown, they appear as children of a collapsible "Removed" list item. Such items can be reinserted into the list by again clicking the reinsert link to the right of the substance. Clicking on the Reinsert all link to the right of the "Removed" list item will cause all of the substances that have been removed to be added back to the list of results. When substances are reinserted back into the result list, they are removed from the "Removed" list item and placed back into the main result list. When there are no substances left to reinsert the "Removed" list item is removed from the result list.

The Sort By pull-down menu controls the ordering of the results list. By default, the list is sorted alphabetically by name. It can also be sorted by the following identification numbers: UN/NA, CAS RN, and STCC. When sorted by a number, the substance names are prefixed with the chosen number type. If a substance does not have the selected number assigned, 'X' characters are used as placeholders. In the next figure, the results list is ordered by UN/NA number, but one of the substances does not have such a number.

Click here and
select UN/NA

The Group By pull-down menu groups the substances in the list by one of the property, symptom, or NFPA 704 categories. When a category from this menu is selected, the results list changes to a list of groupings by the properties, symptoms, or NFPA 704 hazards in the selected category. Each is followed by a number indicating how many substances are in the grouping. Grouping for properties, symptoms, or NFPA 704 hazards that do not contain any substances are not shown. The list of groupings may be augmented with an "Unknown" grouping. This contains the substances which do not have data for the corresponding category, and thus it is not known whether any of the options in the selected category apply.

Click here and
choose one

To view the substances within each grouping, expand the grouping by clicking the "plus sign" to the left of the groupings. Click again to collapse.

When the results list is grouped, substances can still be removed (though the groups themselves cannot be removed). Note that when a substance is removed from a grouped display, that substance is removed from the results list, not just from that grouping. In other words, that substance will be removed from all groupings in which it occurs. In the case were all of the substances have been removed from a grouping, the group will itself be removed. Groupings will never have a count of [0].
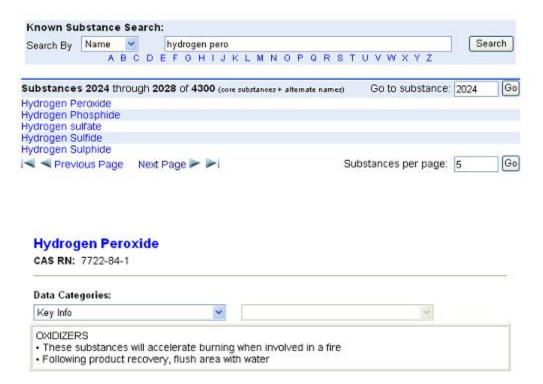
3.   Tutorial

In this section, two scenarios are given as a tutorial for using WISER. In the first scenario, the substance is known; in the second, the substance is not known. WISER can be used in both of these scenarios to assist in responding to the incident.

Note: *The tutorial section contains references to substance counts which may change as updated versions of the WISER database are released. This would be caused by the addition of new substances or updates to the search data. The counts reflected in these sections should be used for example purposes only.*

3.1.   Known Substance

In this scenario, you are the first responder at a scene. There is an overturned cargo tank with 'Hydrogen Peroxide' on the side; the papers on board and the driver verify that it is hydrogen peroxide. There is a small fire caused by the engine on the cargo tank. The driver of the truck has been splashed with the hydrogen peroxide and may have ingested some of it.

Known Substance Search:

Search By [Name ▼] [hydrogen pero   ] [Search]

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Substances 2024 through 2028 of 4300 (core substances + alternate names)   Go to substance: [2024] [Go]

Hydrogen Peroxide
Hydrogen Phosphide
Hydrogen sulfate
Hydrogen Sulfide
Hydrogen Sulphide

|◀ ◀ Previous Page   Next Page ▶ ▶| Substances per page: [5] [Go]

Hydrogen Peroxide
CAS RN: 7722-84-1

Data Categories:

[Key Info ▼]   [▼]

OXIDIZERS
• These substances will accelerate burning when involved in a fire
• Following product recovery, flush area with water

The immediate tasks are to clear out an appropriate area around the tanker truck, treat the driver, and correctly respond to the small fire. Using the WISER application, you enter 'hydrogen per' in the text field and click search. The list of substances will scroll down to substances beginning with 'hydrogen per'.

Click on hydrogen peroxide (above figure). This will bring up the Data Screen for hydrogen peroxide, showing the Key Info.

To determine the appropriate area to clear out, select the Protective Distance option in the data menu, as shown in the following figure. This brings up the Evacuation distance information from the DOT Emergency Response Guidebook (ERG). (The ERG is also accessible in its entirety by selecting the Hazmat submenu.)

For information on the correct response to the fire, select the Fire Procedures hot link in the data menu, as shown below. (The Fire Procedures is also accessible from the Hazmat submenu).

Hydrogen Peroxide
CAS RN: 7722-84-1

Data Categories:

Protective Distance

| Key Info |
| Identification |
| Protective Equipment/Clothing |
| Protective Distance |
| Fire Fighting Procedures |
| Reactivities/Incompatibilities |
Treatment Overview
Basic ...
Properties ...
Hazmat ...
Environment ...
Medical ...

Click here

Hydrogen Peroxide
CAS RN: 7722-84-1

Data Categories:

Fire Fighting Procedures

Fires caused by the compound are best controlled by large amounts of water. Chemical extinguishers should be used as they hasten decomposition of the peroxide. Fire fighters should wear goggles and self contained breathing apparatus.

Water for fires resulting from spillage.

If material involved in fire: use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible.

Evacuation: If fire becomes uncontrollable - consider evacuation of one-half (1/2) mile radius.

In case of fire, water should be applied by the sprinkler system or by hose from a safe distance, preferably with a fog nozzle. Foam may be necessary instead if the peroxide is diluted in a low density flammable solvent. Portable extinguishers should not be used except for very small fires. Peroxides threatened by fire should be wetted from a safe distance for cooling. /Peroxides, Organic and Inorganic/

Finally, treatment of the driver can be determined by selecting the Treatment hot link, as shown below. (The treatment data is also accessible from the Medical submenu).

Hydrogen Peroxide
CAS RN: 7722-84-1

Data Categories:

Fire Fighting Procedures

Key Info
Identification
Protective Equipment/Clothing
Protective Distance
Fire Fighting Procedures
Reactivities/Incompatibilities
Treatment Overview
....
Basic ...
Properties ...
Hazmat ...
Environment ...
Medical ...

Click here

Hydrogen Peroxide
CAS RN: 7722-84-1

Data Categories:

Treatment Overview

0.4.2 ORAL EXPOSURE

A) ADMINISTER WATER immediately to dilute the peroxide. Spontaneous vomiting is common.
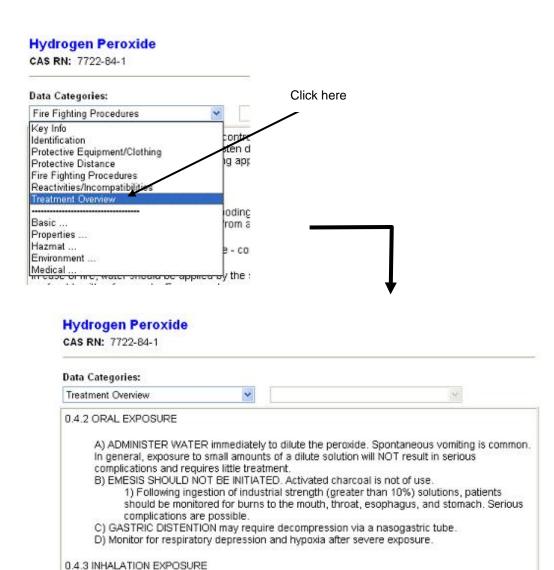In general, exposure to small amounts of a dilute solution will NOT result in serious
complications and requires little treatment.
B) EMESIS SHOULD NOT BE INITIATED. Activated charcoal is not of use.
    1) Following ingestion of industrial strength (greater than 10%) solutions, patients
    should be monitored for burns to the mouth, throat, esophagus, and stomach. Serious
    complications are possible.
C) GASTRIC DISTENTION may require decompression via a nasogastric tube.
D) Monitor for respiratory depression and hypoxia after severe exposure.

0.4.3 INHALATION EXPOSURE

If more in-depth information is required, such as physical properties, it can be found by selecting the category of interest in the data menu, and then the desired data element from the resulting submenu. For example, to view information about decomposition, you select the category 'Properties' from the data menu, and then 'Decomposition' from the resulting submenu.
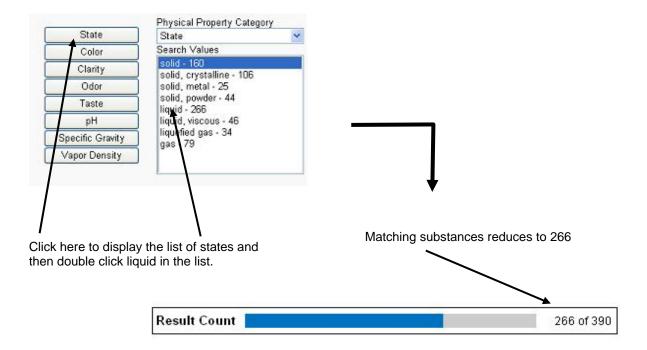
3.2.   Unknown Substance

In this scenario, you are the Hazardous Materials Specialist responding to an incident at a warehouse. The warehouse has been cleared and the situation has been stabilized. Your primary task is to identify the substance and provide information and recommendations to the Incident Commander.

The substance in question has been leaking from an unmarked barrel. It has been described as a colorless liquid with an alcohol smell. The workers from the warehouse are showing the following symptoms: nausea, dizziness, headache, eye irritation, and low body temperature.

Using WISER in this situation, you select the Help Identify link on the menu. If there is an existing search in progress, you should press the 'Start Over' to clear out previously selected symptoms, properties, and NFPA 704 selections.

To enter the properties of the substance, select the Properties tab. Start property selection by selecting 'State' to bring up the possible values of physical state, and selecting 'liquid'. Liquid is now shown in the selected list and the number of matching substances has been reduced to 266 of the original 390.

Click here to display the list of states and then double click liquid in the list.
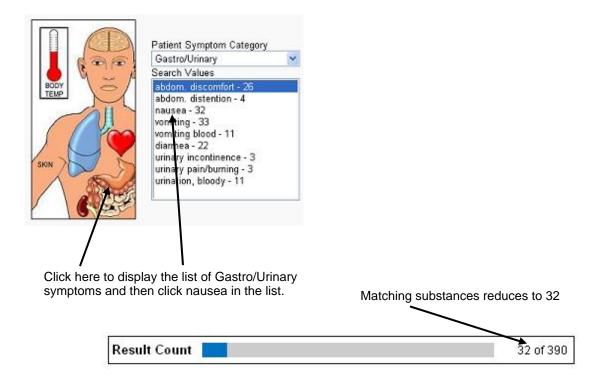
Matching substances reduces to 266

Then, following the same process, select colorless from the Color property and select alcohol-like from the Odor property.

The result of using the properties liquid, colorless, and alcohol-like odor is that the original list of 390 substances has been reduced to 34.
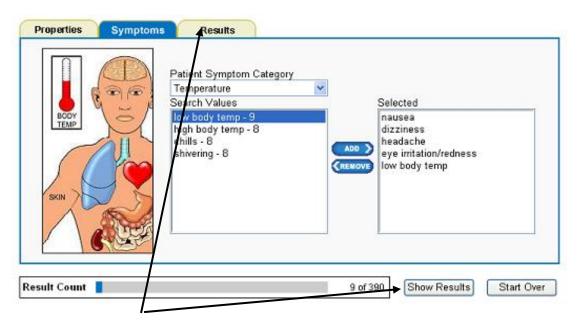
Continue with symptoms selection by selecting the Symptoms tab. The symptoms (nausea, dizziness, headache, eye irritation, and low body temperature) are selected by selecting the body part that shows the symptom. For nausea, click on the stomach.

Click here to display the list of Gastro/Urinary
symptoms and then click nausea in the list.

Matching substances reduces to 32

For dizziness and headache, click on the brain and then select the corresponding values in the list. The
symptoms of eye irritation and low body temperature are selected similarly. For eye irritation, click on the
eyes in the image of the human body. Then, select irritation. For low body temperature, click on the
image of the thermometer and then select low body temperature. To view the results of the search,
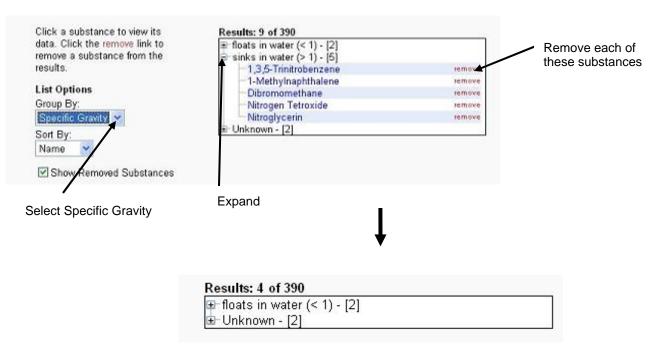select the Results tab or click on the 'Show Results' button shown below.

Click the results tab or Show Results
button to view the substances

The search to this point has resulted in 9 substances that match the symptoms and properties selected. To determine the correct substance, the Results page allows the user to group and sort the substance in different ways, remove substances that are known to be incorrect, and go to the Data Screen for the substances.
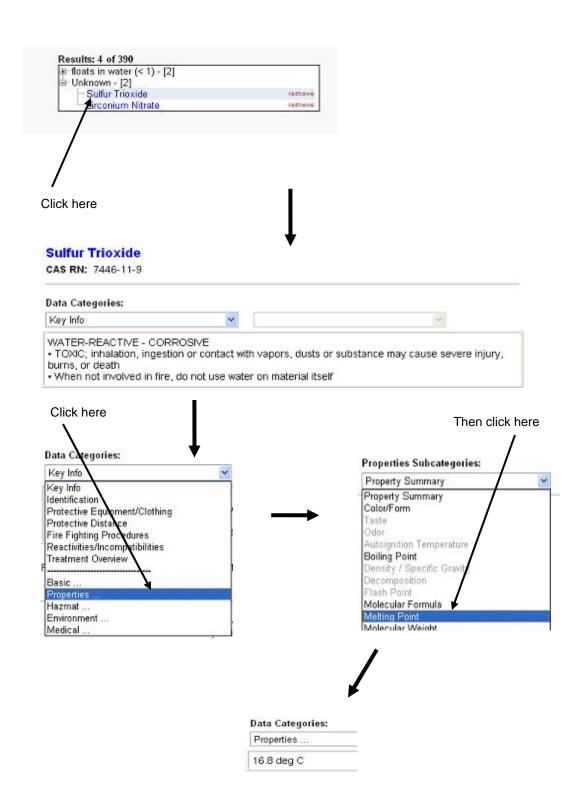
In this tutorial, the user groups by various symptoms and properties until getting to Specific Gravity and that information is used to narrow down the substances even more. Here, the user clicks on the Group-by drop-down list, and selects Specific Gravity. Based on the results of the grouping, the user tests the substance and observes that the substance is not soluble and floats on water. Thus, the "sinks in water" substances can be removed. As demonstrated below, this is done by expanding the "sinks in water" grouping, and then clicking the remove link.

Remove each of these substances

Select Specific Gravity

Expand

The remaining substances need to be examined in more detail to determine the correct substance. First, examine those under the "Unknown" grouping, indicating that WISER does not have specific gravity data for them. Selecting Sulfur Trioxide to view the Data Screen, the Key Info indicates that it is water-reactive. Further investigation indicates that the melting point is 16.8° C. So, at the current temperature, it should be a solid. It is thus likely that this substance can be removed by going back to the Help Identify Screen by clicking the link in the menu and removing the substance from the list of Results.

Results: 4 of 390

⊞ floats in water (< 1) - [2]
⊟ Unknown - [2]
　　├ Sulfur Trioxide　　　　　　　remove
　　└ irconium Nitrate　　　　　　remove

Click here

Sulfur Trioxide
CAS RN: 7446-11-9

Data Categories:

| Key Info | ⌄ | | ⌄ |

WATER-REACTIVE - CORROSIVE
• TOXIC; inhalation, ingestion or contact with vapors, dusts or substance may cause severe injury, burns, or death
• When not involved in fire, do not use water on material itself

Click here

Then click here

Data Categories:

Key Info　　　　　　　　⌄

Key Info
Identification
Protective Equipment/Clothing
Protective Distance
Fire Fighting Procedures
Reactivities/Incompatibilities
Treatment Overview

Basic ...
Properties ...
Hazmat ...
Environment ...
Medical ...

Properties Subcategories:

Property Summary　　　　⌄

Property Summary
Color/Form
Taste
Odor
Autoignition Temperature
Boiling Point
Density / Specific Gravity
Decomposition
Flash Point
Molecular Formula
Melting Point
Molecular Weight

Data Categories:

Properties ...

16.8 deg C

Next, examine Zirconium Nitrate. Using the same method as before by selecting the Properties… Data Category and then choosing Solubilities in from Properties Subcategory. This substance is water-soluble and hence is unlikely to be the correct substance. It is likewise removed.

The final results of the search are Isopropanol and n-Butyl Alcohol. Further investigation of each, using the Data Screen, shows that these two hydrocarbons have very similar characteristics and procedures. For example, the Emergency Response Guidelines for both are the same.

4.   About NLM

The National Library of Medicine (NLM) is the world's largest medical library. The Specialized Information Services (SIS) Division of NLM is responsible for information coverage and services for several areas, including environmental health and toxicology, AIDS, and directories to other information resources concerned with health and biomedicine. SIS maintains the Hazardous Substance Data Bank (HSDB), covering over 4700 substances, their toxicology, emergency handling procedures, and environmental fate. The NLM is part of the National Institutes of Health, an agency of the U.S. Department of Health and Human Services.